

REMARKS

Applicant notes that the Information Disclosure Statements filed on November 28, 2000 and February 13, 2001 are not acknowledged. Applicant respectfully requests that the Examiner provide acknowledgment of these Information Disclosure Statements in the next Official Action.

Claims 1-5 are pending. Claims 1-5 stand rejected.

Rejections Under 35 U.S.C. § 102

Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,490,635 to Harrison et al. Applicant respectfully submits that this rejection is overcome by the amendment to the claims for the reasons set forth below.

Applicant's invention, as recited in claim 1, includes features which are neither disclosed nor suggested by Harrison et al., namely:

... a rotor with a permanent magnet having P ... polarities and a polarity angle ...

... any one of the coils has isosceles sides interlinking with a magnetic field generated by the polarities extension lines of the isosceles sides extending along centers of winding-bundles of the coil, crossing each other at a shaft center and having a vertex angle of $360/P$ degree, the vertex angle being equal to the polarity angle. (Emphasis added)

These features are described in Applicant's specification, for example, at page 7, lines 18-20, page 8, lines 2-8 and Figs. 1A-1C.

According to claim 1, the rotor has P polarities and a polarity angle, and the coil has isosceles sides that interlink with a magnetic field generated by the polarities extension lines of the isosceles sides extending along the center of the

winding bundles of the coil. In addition, the polarities extension lines cross each other at the shaft center of the motor and have a vertex angle of $360/P$ degrees, with the vertex angle being equal to the polarity angle.

This is different from Harrison et al., in which, the polarity extension lines of the isosceles sides extending along the center of the winding bundles do not cross each other at the shaft center. This is clearly illustrated in Fig. 2 of Harrison et al., which is annotated and attached hereto as **Exhibit A**. In addition, there is no disclosure or suggestion in Harrison et al. that the angle formed by the extension lines of the isosceles sides is the same as the polarity angle.

In contrast, Applicant's invention, as recited in claim 1, specifies that i) the rotor has P polarities and a polarity angle, ii) the extension lines of the isosceles sides extend through centers of the winding bundle and cross each other at the shaft center, and iii) the vertex angle formed by the extension lines is equal to the polarity angle.

It is because Applicant has included the features of i) a rotor with P polarities and a polarity angle, ii) coils having isosceles sides with polarity extension lines extending along centers of the winding bundles and crossing each other at the shaft center with a vertex angle of $360/P$ degrees, and iii) the vertex angle being equal to the polarity angle, that Applicant is able to reduce the number of coils as well as increase the motor constant. Harrison et al. does not achieve this advantage because Harrison et al. does not have i) coils in which the extension lines of the isosceles sides extending along centers of the winding bundles of the coil cross each other at the shaft center or ii) the vertex angle formed by the extension lines is equal to the polarity angle.

For the reasons set forth above, claim 1 is neither disclosed nor suggested by Harrison et al., thus, claim 1 is not subject to rejection under 35 U.S.C. § 102(b) as being anticipated by Harrison et al.

Rejections Under 35 U.S.C. § 103

At page 3, paragraph 6 of the Office Action "Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,490,635 to Harrison et al. in view of common knowledge in the art." Applicant respectfully traverses this rejection for the reasons set forth below.

The Office Action does not cite additional prior art to overcome the deficiencies of Harrison et al. identified above with respect to claim 1. Thus, as claim 2 depends upon claim 1, it is likewise not subject to rejection for at least the reasons set forth above with respect to claim 1. Therefore, Applicant respectfully requests that the rejection of claim 2 be withdrawn and the claim allowed.

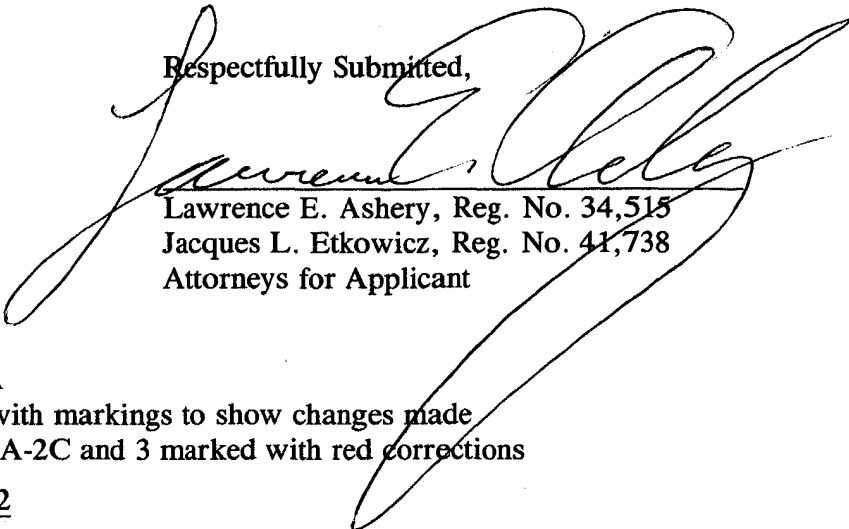
At page 3, paragraph 7 of the Office Action "Claims 3-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,490,635 to Harrison et al. in view of U.S. Patent No. 4,578,606 to Welterlin." Applicant respectfully submits that this rejection is overcome by the amendments of the claims for the reasons set forth below.

The Office Action readily admits that Harrison et al. "fails to disclose ... the coil winding bundles forming the isosceles sides are disposed within an area covered by an angle of $360/(4 \times P)$ degree both inside and outside with respect to a center of the angle of $360/P$ degree, and the coils adjacent to each other are spaced out at intervals of $(360/P) \times (5/3)$ degree." The Examiner relies upon Welterlin, however, as disclosing these features. Welterlin does not disclose or suggest, however, that the angle formed by the extension lines of the isosceles sides of the coil windings is the same as the polarity angle of the permanent magnet. Thus, Welterlin fails to make up for the deficiency of Harrison et al.

As the Office Action fails to cite additional art which makes up for the deficiencies of Harrison et al. and Welterlin, Applicant respectfully urges that the rejection of claims 3-5 as being unpatentable over Harrison et al. in view of Welterlin is improper and should be withdrawn.

In view of the amendments and remarks set forth above, the above-identified application is in condition for allowance, which action is respectfully requested.

Respectfully Submitted,


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Enclosures: Exhibit A

Version with markings to show changes made

Figures 2A-2C and 3 marked with red corrections

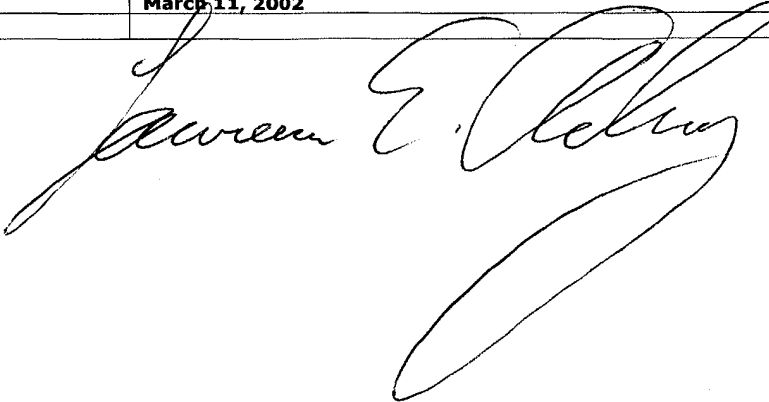
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

**BRUSHLESS MOTOR BRUSHLESS MOTOR HAVING ISOSCELES
SIDED STATOR COILS AND POSITION DETECTION CAPABILITY**

IN THE CLAIMS:

Please replace claim 1 with the following amended claim:

- 1 1. (Twice Amended) A brushless motor comprising:
 - 2 a rotor with a permanent magnet having P (P is an integer not less
 - 3 than two) polarities and a polarity angle; and
 - 4 a stator facing said rotor and having a plurality of coils,
 - 5 wherein any one of the coils has isosceles sides interlinking with a
 - 6 magnetic field generated by the polarities extension lines of the isosceles sides
 - 7 extending along centers of winding-bundles of the coil, crossing each other at a
 - 8 shaft center and having a vertex angle of $360/P$ degree, the vertex angle being equal
 - 9 to the polarity angle.